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ABSTRACT

The mathematics learning objectives contained in this volume are congruent with the Texas "State Board of Education Rules for Curriculum" which outlines the rules Education Rules for Curriculum which outline the rules and procedures for implementation of Section 21.101 of the Texas Education Code. These objectives and the measurement specifications are provided for use by teachers and other educators responsible for pupil instruction and for test development specialists involved with the preparation of the Texas Assessment of Basic Skills (TABS) tests. Beginning with the 1985-1986 school year, the TABS test will be based upon the objectives in this publication. For grades 3, 5, and 9, the general objectives are presented, followed by detailed objectives and measurement specifications. (Author/BW)

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Texas Assessment of Basic Skills

Mathematics Objectives and Measurement Specifications 1986 Grade 3, Grade 5, and Grade 9

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Texas Assessment of Basic Skills

Mathematics Objectives and Measurement Specifications 1986 Grade 3, Grade 5, and Exit Level

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Division of Educational Assessment
Texas Education Agency
Austin, Texas

Foreword

The learning objectives contained in this volume are congruent with the *State Board of Education Rules for Curriculum* which outlines the rules and procedures for implementation of Section 21.101 of the Texas Education Code. These objectives and the measurement specifications are provided for use by teachers and other educators responsible for pupil instruction and for test development specialists involved with the preparation of the Texas Assessment of Basic Skills (TABS) tests. Beginning with the 1985-1986 school year, the TABS tests will be based upon the objectives in this publication.

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Mathematics

List of Objectives

Grade 3

Objective 1: Arrange a group of three whole numbers from least to greatest or greatest to least.

Objective 2: Identify the place value for a given digit of a three- or four-digit whole number.

Objective 3: Express whole numbers in expanded notation.

Objective 4: Complete a pattern involving multiples of 2, 3, 4, 5, or 10.

Objective 5: Add whole numbers having as many as three digits, with or without regrouping.

Objective 6: Subtract whole numbers having as many as three digits, with or without regrouping.

Objective 7: Solve one-step word problems involving addition of whole numbers.

Objective 8: Solve one-step word problems involving subtraction of whole numbers.

Objective 9: Use pictorial models to identify fractional parts of a whole or of a group of like objects.

Objective 10: Identify pictorial models of two- and three-dimensional shapes.

Objective 11: Select the unit of measure used to determine length, weight/mass, or capacity/volume.

Grade 5

Objective 1: Interpret place value in whole numbers and decimals having no more than five digits.

Objective 2: Identify equivalent fractions.

Objective 3: Multiply whole numbers less than 1000.

Objective 4: Divide whole numbers that have four or fewer digits.

Objective 5: Add and subtract decimals that have no more than five digits.

Objective 6: Solve two-step word problems involving addition/subtraction of whole numbers.

Objective 7: Solve one-step word problems involving multiplication/division of whole numbers.

Objective 8: Solve one-step word problems involving addition/subtraction of decimals.

Objective 9: Find the perimeter or area of polygons using grids.

Objective 10: Estimate measurements in metric and customary units.

Objective 11: Interpret graphs.

Grade 9

Objective 1: Identify the relationship between decimals, fractions, and percents.

Objective 2: Determine simple probabilities.

Objective 3: Add and subtract fractions.

Objective 4: Multiply and divide decimals.

Objective 5: Solve two- or three-step word problems using the basic operations.

Objective 6: Solve word problems using ratios, proportions, and percents.

Objective 7: Solve personal finance problems.

Objective 8: Find the areas of rectangles and triangles.

Objective 9: Solve word problems involving metric/customary measurements using the basic operations.

Objective 10: Use information from charts or graphs to solve word problems.

Objective 11: Use formulas to solve problems.

Grade 3 Mathematics

General Specifications

I. Test Items

A. All written material, including instructions, item stems, solutions, and answer choices, shall have vocabulary drawn from the Texas Education Agency (TEA) cumulative vocabulary list for the second grade.

B. Word problems shall represent various ethnic groups of populations in Texas. The three main groups are black, Hispanic, and white.

C. Word problems shall be free of stereotyping of age, sex, ethnicity, and geographical location.

D. For each item, there shall be four response choices with only one correct response.

E. Neither "none of the above" nor "all of the above" shall be used as an answer choice.

G. Problem situations shall be appropriate for third grade students.

I. All fractions shall be written in vertical form.

II. Test Package Format

A. Graphic displays, their corresponding items, and response choices shall appear on the same or facing pages.

B. Type size shall be appropriate for third grade students.

Grade 3 Mathematics

Objectives and Measurement Specifications

Objective 1
Arrange a group of three whole numbers from least to greatest or greatest to least.

Enabling Skills

1. Counting
2. Applying place value concepts
3. Ordering

Description of Test Questions

1. The numbers arranged in groups shall not contain reversals (e.g., 87, 78).
2. No more than one zero shall be in any number that is used.
3. There shall be an equal balance of the two types of arrangements (greatest to least and least to greatest).
4. The word least and greatest shall be underlined in the item stem.
5. Numbers shall be limited to three digits.

Description of Answer Choices

1. If the stem asks for arranging numbers from greatest to least, no incorrect answer shall present these numbers ordered from least to greatest. If the stem asks for arranging numbers from least to greatest, no incorrect answer shall present these numbers ordered from greatest to least.
2. All answer choices will be comprised of the same numbers arranged in different orders.
3. Commas shall not be used to separate the numbers presented in each answer choice.
4. The answer choices shall be clearly distinguishable from each other.

Example of Test Questions
Which group below shows the three numbers in order from greatest to least? Mark your answer.

⬭ 131 128 121

⬭ 128 121 131

⬭ 131 121 128

⬭ 121 131 128

Objective 2
Identify the place value for a given digit of a three- or four-digit whole number.

Enabling Skills

1. Identifying by name the place value of each digit
2. Reading numbers

Description of Test Questions

1. The whole numbers used in the items shall have three or four digits.
2. Test questions will not include total value or face value (e.g., in the number 85, 8 is the face value of the number in the tens place; ten is the place value; 80 is the total value of that digit).
3. No commas shall be used in four-digit numbers.
4. There shall be no repetition of digits in the numbers used.
5. The place value referred to in the item stem shall be underlined.
6. There shall be two items of each type: (a) identifying the name for a given place value and (b) identifying the numeral that has a given place value.

Description of Answer Choices

1. Answer choices that refer to place value names will refer to place values that range from ones to thousands.

Examples of Test Questions

(a) In the number 8316, the 3 is in what place? Mark your answer.

- ⬭ hundreds
- ⬭ thousands
- ⬭ tens
- ⬭ ones

(b) In 5142, which numeral is in the thousands place? Mark your answer.

- ⬭ 5
- ⬭ 1
- ⬭ 2
- ⬭ 4

–3–

Objective 3
Express whole numbers in expanded notation.

Enabling Skills

1. Applying place value concepts
2. Reading and writing whole numbers

Description of Test Questions

1. No numbers that are used will include zeros.
2. Numbers shall be read from left to right (i.e., descending value).
3. Numbers shall have three or four digits.
4. There shall be two items of each type:
   (a) given the number, identify the expanded notation in either words or numbers
   (b) given the expanded notation in either words or numbers, identify the number

Description of Answer Choices

1. Answer choices identifying expanded form shall be in either word or number format.
2. Answer choices identifying numbers shall be in either word or number format.

Examples of Test Questions
Mark the space next to your answers.

(a) 4123 =

⬭ 4 thousands + 1 hundred + 2 tens + 3 ones

⬭ 4 hundreds + 1 ten + 23 ones

⬭ 41 tens + 23 ones

⬭ 4 thousands + 12 hundreds + 3 tens

(b) 4000 + 100 + 20 + 3 =

⬭ 4123

⬭ 4003

⬭ 3214

⬭ 1234

14

Objective 4
Complete a pattern involving multiples of 2, 3, 4, 5, or 10.

Enabling Skills

1. Group objects into sets of twos, threes, fours, fives, and tens
2. Skip count by twos, threes, fours, fives, and tens

Description of Test Questions

1. A boxed series of four numbers followed by three blank spaces will be presented.
2. The numbers used shall be whole numbers less than 100.
3. The four numbers that appear in the box will be consecutive multiples of 2, 3, 4, 5, or 10 placed in ascending order.
4. Patterns shall begin with a multiple of the number requested for counting, excluding the number itself.
5. Commas shall be used to separate numbers in the series.
6. Of the four test questions used, at least three different multiple patterns shall be tested.

Description of Answer Choices

1. The numbers used in the answer choices will not exceed two digits.

Example of Test Questions
Complete the pattern. Mark your answer.

20, 30, 40, 50, ___, ___, ___

⬭ 60, 70, 80

⬭ 70, 80, 90

⬭ 52, 54, 56

⬭ 55, 60, 65

Objective 5
Add whole numbers having as many as three digits, with or without regrouping.

Enabling Skills

1. Counting and ordering
2. Grouping
3. Applying place value concepts
4. Joining and separating (concrete materials)
5. Using addition algorithms

Description of Test Questions

1. Problems will be presented in vertical form.
2. The addends will be whole numbers between 10 and 999.
3. There shall be one each of four types of problems:
   (a) 2 addends with no regrouping
   (b) 3 addends with no regrouping
   (c) 2 addends with one regrouping
   (d) 3 addends with one regrouping
4. There shall be no more than one zero in any problem.

Description of Answer Choices

1. Incorrect answers shall represent common errors in computation.
2. Incorrect answers for problems having two addends shall not include the difference of the addends.

Example of Test Questions
Solve the problem. Mark your answer.

$$\begin{array}{r} 327 \\ 23 \\ +14 \\ \hline \end{array}$$

⬭ 364

⬭ 354

⬭ 350

⬭ 464

16

Objective 6
Subtract whole numbers having as many as three digits, with or without regrouping.

Enabling Skills

1. Counting and ordering
2. Grouping
3. Applying place value concepts
4. Joining and separating (concrete materials)
5. Using subtraction algorithms

Description of Test Questions

1. Problems will be presented in vertical form.
2. The numbers will be whole numbers between 10 and 999.
3. Each subtraction problem will have one minuend and one subtrahend.
4. There shall be no more than one zero in any problem.
5. Two of the four subtraction problems will require <u>one</u> regrouping. The other two problems will require <u>no</u> regrouping.

Description of Answer Choices

1. Incorrect answers shall represent common errors in computation.
2. Incorrect answers shall not include the sum of the numbers.

Example of Test Questions
Solve the problem. Mark your answer.

$$\begin{array}{r} 304 \\ -\,92 \\ \hline \end{array}$$

- ⬭ 212
- ⬭ 202
- ⬭ 292
- ⬭ 392

Objective 7
Solve one-step word problems involving addition of whole numbers.

Enabling Skills

1. Using appropriate vocabulary
2. Reading for understanding
3. Determining whether there is enough information
4. Determining the question
5. Selecting the operation
6. Modeling
7. Using addition skills
8. Setting up a way of solving the problem

Description of Test Questions

1. All items must use only one operation.
2. No extraneous data shall be included in the items.
3. All numbers in a problem will be whole numbers between 1 and 99.
4. Problems shall not require regrouping.
5. An addition problem may have no more than three addends.
6. Neither money nor age problems shall be used.
7. Each word problem will consist of two, three, or four sentences, with the total number of words not to exceed 30.

Description of Answer Choices

1. The numbers used in the answer choices will not exceed two digits.
2. Units shall be specified in the answer choices.
3. Incorrect answers will reflect common errors in problem-solving (i.e., wrong choice of operations) as well as common errors in computation.

Example of Test Questions
Solve the problem. Mark your answer.

Karen had 13 marbles in a jar. Her brother put 25 more marbles in the jar. How many marbles were in the jar then?

⬭ 38 marbles

⬭ 18 marbles

⬭ 25 marbles

⬭ 12 marbles

18

Objective 8
Solve one-step word problems involving subtraction of whole numbers.

Enabling Skills

1. Using appropriate vocabulary
2. Reading for understanding
3. Determining whether there is enough information
4. Determining the question
5. Selecting the operation
6. Modeling
7. Using subtraction skills
8. Setting up a way of solving the problem

Description of Test Questions

1. All items must use only one operation.
2. No extraneous data shall be included in any item.
3. All numbers in a problem will be whole numbers between 1 and 99.
4. Problems shall not require regrouping.
5. Each problem shall have one minuend and one subtrahend.
6. Neither money nor age problems shall be used.
7. A problem will consist of two, three, or four sentences, with the total number of words not to exceed 30.

Description of Answer Choices

1. Units shall be specified in the answer choices.
2. Incorrect answers will reflect common errors in problem-solving (i.e., using the wrong operation) as well as common errors in computation.

Example of Test Questions
Solve the problem. Mark your answer.

There are 96 seats on the school bus. Only 34 children rode the bus today. How many seats were empty?

- ⬭ 62 seats
- ⬭ 130 seats
- ⬭ 52 seats
- ⬭ 120 seats

Objective 9
Use pictorial models to identify fractional parts of a whole or of a group of like objects.

Enabling Skills

1. Identifying parts of a whole using concrete objects
2. Interpreting symbols to describe fractional parts
3. Identifying fractional parts of a set
4. Identifying fractional parts of a whole

Description of Test Questions

1. The fractional parts to be identified shall be limited to $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{3}$, and $\frac{3}{4}$.
2. Shading is to be used to indicate the fractional part to be identified.
3. All partitions of wholes or sets are to be in equal parts.
4. A set will consist of no more than four elements.
5. All fractions shall be presented in their vertical form (i.e., $\frac{1}{4}$, not ¼).
6. Optical illusions shall not be used.
7. Questions will include one of each of the following:
   (a) identify a given part of a whole
   (b) identify a given part of a set
   (c) given a fraction, identify the appropriate pictorial model
   (d) given a fraction, identify the set which indicates the appropriate part

Description of Answer Choices

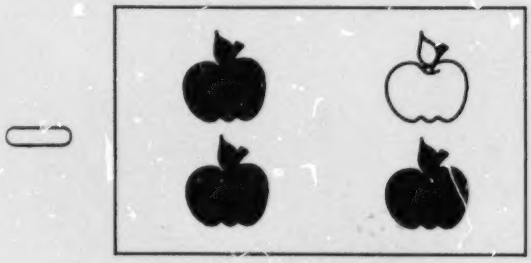
1. When fractions are used in answer choices, they shall be presented in their vertical form (i.e., $\frac{1}{4}$, not ¼).
2. All sets or wholes presented in the answer choices shall be divided into equal parts.

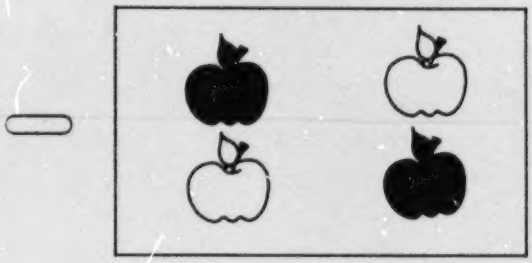
Example of Test Questions

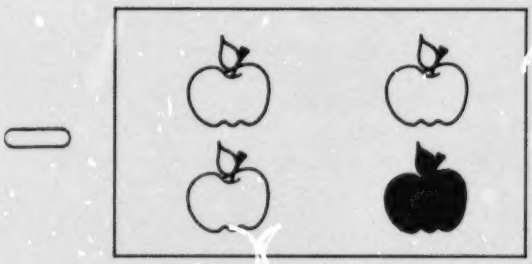
(a) What part of the rectangle is shaded? Mark your answer.

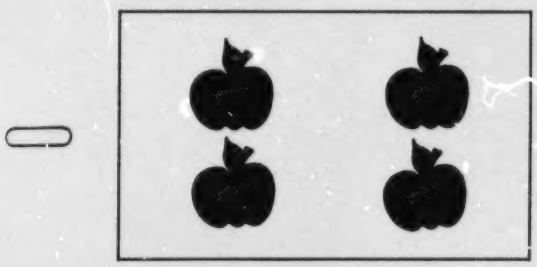
- ⬭ $\frac{1}{4}$
- ⬭ $\frac{1}{3}$
- ⬭ $\frac{1}{2}$
- ⬭ $\frac{3}{4}$

(b) Which set has $\frac{3}{4}$ of the apples shaded? Mark your answer.









Objective 10
Identify pictorial models of two- and three-dimensional shapes.

Enabling Skills

1. Classifying objects
2. Using geometric vocabulary
3. Identifying geometric figures

Description of Test Questions

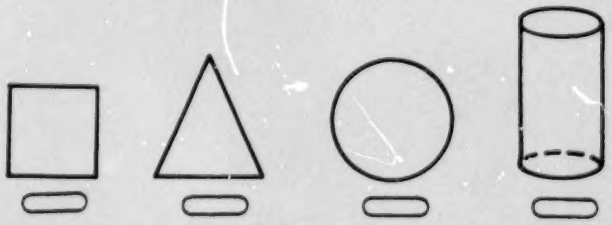
1. Two-dimensional figures will be restricted to circles, squares, rectangles, and triangles.
2. Three-dimensional figures will be restricted to cubes, spheres, cylinders, and cones.
3. Three-dimensional figures shall be drawn with "dashed" lines for hidden edges.
4. Test questions shall include one of each of the following in the item stems:
   (a) a 2-dimensional figure with the name to be identified,
   (b) the name of a 2-dimensional figure with the figure to be identified,
   (c) a 3-dimensional figure with the name to be identified, and
   (d) the name of a 3-dimensional figure with the figure to be identified.

Description of Answer Choices

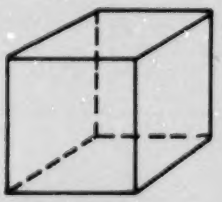
1. No set of answer choices shall include both two- and three-dimensional figures having the same shape (e.g., a circle and a sphere shall not appear in the same set of choices).
2. If a square is to be identified, a rectangle shall not be depicted in an incorrect answer, and vice versa. Similarly, if a cube is to be identified, a rectangular solid shall not be depicted in an incorrect answer.
3. Two-dimensional figures other than circles, squares, rectangles, and triangles and three-dimensional figures other than cubes, spheres, cylinders, and cones may be depicted/named in the distractors.

Examples of Test Questions

(a) Which picture below is a <u>square?</u> Mark your answer.



(b) What is the name of this shape? Mark your answer.



- ⬭ cube
- ⬭ sphere
- ⬭ cylinder
- ⬭ cone

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Objective II
Select the unit of measure used to determine length, weight/mass, or capacity/volume.

Enabling Skills

1. Measuring objects
2. Distinguishing between units for measuring length, weight/mass, or capacity/volume

Description of Test Questions

1. The measurement units that may be used are:

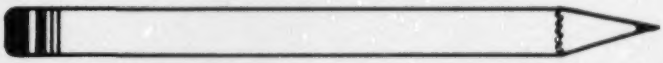
   Metric: centimeter, meter, kilometer, gram, kilogram, liter
   Customary: inch, foot, yard, pound, pint, quart, gallon

2. Equal numbers of test items shall be metric and customary.
3. Some picture stimuli shall be used.
4. Items shall include at least one each of:
   (a) length
   (b) weight/mass
   (c) capacity/volume

Description of Answer Choices

1. The answer choices of an item shall all be expressed in customary or metric units. Customary and metric units shall not appear in the same set of answer choices.
2. Customary units other than inch, foot, yard, pound, pint, quart, and gallon may not be used as distractors in problems concerning customary units. Metric units other than centimeter, meter, gram, kilogram, liter, and kilometer may not be used as distractors in problems concerning metric units.
3. No abbreviations shall be used for units of measure.

Example of Test Questions
Mark your answer.



The length of your pencil would be measured in _____ .

- ⬭ centimeters
- ⬭ grams
- ⬭ kilograms
- ⬭ liters

Grade 5 Mathematics

General Specifications

I. Test Items

A. All written material, including instructions, item stems, solutions, and answer choices, shall have vocabulary drawn from the Texas Education Agency (TEA) cumulative vocabulary list for the fourth grade.

B. Word problems shall represent various ethnic groups of populations in Texas. The three main groups are black, Hispanic, and white.

C. Word problems shall be free of stereotyping by age, sex, ethnicity and geographical location.

D. For each item, there shall be four responses with only one correct response.

E. Neither "none of the above" nor "all of the above" shall be used as an answer choice.

F. Problem situations shall be appropriate for fifth grade students.

G. All fractions shall be written in vertical form.

H. Money problems shall be written using decimal notation.

II. Format for Test Package

A. Graphics, their corresponding items, and response choices shall appear on the same or facing pages.

B. Type size shall be appropriate for fifth grade students.

Objectives and Measurement Specifications

Objective 1
Interpret place value in whole numbers and decimals having no more than five digits.

Enabling Skills

1. Identifying by name the value of each place
2. Reading and writing numbers

Description of Test Questions

1. The numbers used shall be limited to five places.
2. Commas shall be used only in five-digit whole numbers.
3. Decimals shall be limited to tenths and hundredths.
4. Test questions will include total and face value (i.e., in the number 85, 8 is the face value of the number in the tens place; ten is the place value; 80 is the total value of that digit).
5. Two questions shall assess place value in whole numbers, and two shall assess place value in decimals.
6. The place value or numeral referred to in a question shall be underlined.

Description of Answer Choices

1. The place values referred to in the incorrect answers can range from ten thousands to hundredths.
2. Decimal answer choices for total value problems shall be written in fractional form.

Examples of Test Questions

(a) In the number 7164 which digit is in the tens place?

A 6

B 7

C 1

D 4

(b) In the number 3.47 the value of the 4 is _____ .

A $\frac{4}{10}$

B 4

C $\frac{4}{100}$

D 40

Objective 2
Identify equivalent fractions.

Enabling Skills

1. Identifying parts of a whole using concrete objects
2. Interpreting symbols to describe fractional parts
3. Identifying fractional parts of a set
4. Identifying fractional parts of a whole
5. Identifying equivalent fractional parts

Description of Test Questions

1. Equivalent fractions and pictorial models are limited to halves, thirds, fourths, fifths, sixths, eighths, tenths, twelfths, and sixteenths.
2. Each model depicted will have parts that are equal in size and shape.
3. Equivalent models must have the same general shape.
4. Equal numbers of questions shall refer to pictorial models and to numerical expressions for fractions.
5. No mixed fractions shall be used or represented.

Description of Answer Choices

1. Answer choices will consist of pictorial models or numerical expressions for fractions.

Examples of Test Questions

(a) Which figure below has a fractional part shaded that is equivalent to $\frac{1}{2}$?

A B C D

(b) Which fraction means the same as the fraction below?

$\frac{1}{2}$

A $\frac{2}{4}$

B $\frac{4}{6}$

C $\frac{3}{8}$

D $\frac{2}{1}$

Objective 3
Multiply whole numbers less than 1000.

Enabling Skills

1. Modeling the concept of multiplication
2. Using multiplication facts
3. Using the knowledge of place value to regroup
4. Using the multiplication algorithm

Description of Test Questions

1. All whole numbers used as factors shall be less than 1000.
2. Columnar format shall be used to present the problems.
3. No more than one three-digit factor may be used in a problem.

Description of Answer Choices

1. If a set of answers includes a five-digit number, commas shall be used in all four- and five-digit choices.
2. Commas shall not be used to separate digits when all answer choices have less than five digits.
3. Incorrect answers shall represent common errors in computation.

Example of Test Questions
Solve the problem.

$$\begin{array}{r} 324 \\ \times 18 \\ \hline \end{array}$$

A 5,832

B 2,916

C 5,732

D 57,132

Objective 4
Divide whole numbers that have four or fewer digits.

Enabling Skills

1. Modeling the concepts of division
2. Using division facts
3. Using the knowledge of place value to regroup
4. Understanding the meaning of remainder
5. Using the division algorithm

Description of Test Questions

1. Problems shall use the "$)\overline{\quad}$" symbol, not "÷."
2. Remainders shall be expressed as "r" and not as fractions.
3. Dividends shall not exceed four digits.
4. Zeros shall not be included in both the tens and hundreds places of the dividend.
5. Divisors shall not have more than two digits. In two-digit divisors, each digit shall have a value less than or equal to five.
6. In two problems, one-digit divisors shall be used, and in the two other problems, two-digit divisors shall be used.
7. Exactly two problems shall have a non-zero remainder, which shall be indicated by "r."

Description of Answer Choices

1. Incorrect choices shall represent common errors in computation.

Example of Test Questions
Solve the problem.

$12\overline{)427}$

A 35 r 7

B 36 r 5

C 350 r 7

D 35 r 12

28

–5–

Objective 5
Add and subtract decimals that have no more than five digits.

Enabling Skills

1. Applying place value concepts
2. Reading numerals containing tenths and hundredths
3. Aligning the decimals and adding or subtracting numbers that do not have the same number of decimal places

Description of Test Questions

1. Problems shall be displayed horizontally.
2. Addition problems shall have no more than three addends.
3. The maximum number of digits in any one number is five, with no more than two of these to the right of the decimal point.
4. There shall be no more than one money problem.
5. Two of the problems shall require regrouping.
6. In at least one problem, the numbers to be added or subtracted shall have different numbers of places to the right of the decimal point.
7. Two problems shall be addition and two shall be subtraction.

Description of Answer Choices

1. Incorrect choices shall represent common errors in computation and decimal placement.
2. Maximum number of digits in any answer choice is five with no more than three of these to the right of the decimal point.

Examples of Test Questions

(a) Solve the problem.

$7.26 + 9.13 + 0.49 =$

A 16.88

B 20.29

C 55.39

D 167.18

(b) Solve the problem.

$14.79 - 8.2 =$

A 6.59

B 13.97

C 6.77

D 14.59

Objective 6
Solve two-step word problems involving addition/subtraction of whole numbers.

Enabling Skills

1. Using appropriate vocabulary
2. Applying place value concepts
3. Writing mathematics sentences
4. Reading for understanding
5. Determining whether there is enough information
6. Determining the question
7. Selecting the operation
8. Using addition and subtraction

Description of Test Questions

1. All whole numbers shall be less than 1000.
2. No extraneous information shall be given in a test question.
3. Each step of a problem shall be described in a separate sentence.
4. Money shall not be used.

Description of Answer Choices

1. Units shall be specified in the answer choices.
2. Incorrect choices shall reflect common errors in problem-solving (e.g., wrong choice of operations) as well as common errors in computation.
3. Answers that result from multiplying or dividing the numbers presented in the word problems may be used as distractors.

Example of Test Questions
Solve the problem.

Jo had 145 stamps. Her brother gave her 89 more. Then she sold 52 stamps. How many did she have then?

A 182 stamps

B 284 stamps

C 6 stamps

D 170 stamps

–5–

Objective 7
Solve one-step word problems involving multiplication/division of whole numbers.

Enabling Skills

1. Using appropriate vocabulary
2. Reading for understanding
3. Identifying the question
4. Deciding on a plan for solution
5. Using multiplication and division

Description of Test Questions

1. Only one operation may be used in any item.
2. No extraneous information shall be presented in a test question.
3. Each piece of information in a problem shall be described in a separate sentence.
4. In division problems, the dividend shall be no more than three digits and the divisor shall be one digit.
5. In the division problems, there will be no remainders.
6. Factors shall be no more than two digits.
7. There shall be an equal balance of multiplication and division items.
8. Money shall not be used.

Description of Answer Choices

1. Units shall be specified in the answer choices.
2. Incorrect answers will reflect common errors in problem-solving (e.g., wrong choice of operations) as well as common errors in computation.

Example of Test Questions
Solve the problem.

Sarah bought 6 boxes of cookies for the class party. Each box had 18 cookies in it. How many cookies did she buy in all?

A 108 cookies

B 24 cookies

C 3 cookies

D 68 cookies

Objective 8
Solve one-step word problems involving addition/subtraction of decimals.

Enabling Skills

1. Applying place value concepts
2. Writing mathematics sentences
3. Reading for understanding
4. Determining whether there is enough information
5. Determining the question
6. Selecting the operation
7. Modeling
8. Adding or subtracting decimals

Description of Test Questions

1. All numbers given in a problem shall have the same number of digits to the right of the decimal point.
2. All decimals that are used shall be limited to tenths and hundredths.
3. Two problems shall involve decimals using money.
4. No extraneous data shall be used in item stems.

Description of Answer Choices

1. Incorrect answers will represent common errors in problem-solving as well as common errors in computation.

Example of Test Questions
Solve the problem.

Janice had $8.16. She bought a book for $1.72, including tax. How much money did she have left after buying the book?

A $6.44

B $7.64

C $9.88

D $7.44

Objective 9
Find the perimeter or area of polygons using grids.

Enabling Skills

1. Applying perimeter and area concepts
2. Using properties of geometric figures

Description of Test Questions

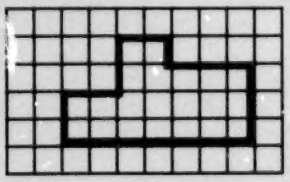
1. All items shall show either polygons drawn on a grid or polygons drawn with grids inside them.
2. A grid unit can only be depicted as a whole or half unit. No other fractional parts are permitted.
3. The formula for determing the perimeter or area will not be provided.
4. The number of units to be counted shall be less than 50.

Description of Answer Choices

1. All answer choices shall include specification of units. Answer choices to area problems will include the specification "square units."

Examples of Test Questions

(a) What is the perimeter of the polygon in the grid?



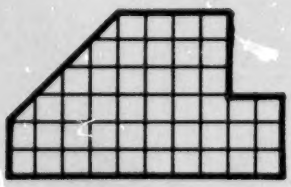
A 22 units

B 19 units

C 20 units

D 60 units

(b) What is the area of this polygon?



A 46 square units

B 50 square units

C 14 square units

D 60 square units

Objective 10
Estimate measurements in both metric and customary units.

Enabling Skills

1. Identifying appropriate units of measure
2. Comparing the relative sizes of units in both the metric and customary systems
3. Estimating length, weight/mass, or capacity/volume
4. Comparing sizes of objects

Description of Test Questions

1. The measurement units that may be used are:

   Metric: millimeter, centimeter, meter, kilometer (mm, cm, m, km)
   milligram, gram, kilogram (mg, g, kg)
   milliliter, liter, kiloliter (ml, l, kl)

   Customary: inch, foot, yard, mile (in., ft, yd, mile)
   ounce, pound, ton
   cup, pint, quart, gallon

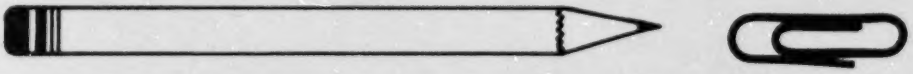
2. Equal numbers of test items shall be metric and customary.
3. Picture stimuli may be used.
4. Items shall include at least one of each of:
   (a) length
   (b) weight/mass
   (c) capacity/volume

Description of Answer Choices

1. All answer choices of an item shall be expressed in customary or metric units. Both customary and metric units shall <u>not</u> appear in the same set of answer choices.
2. Customary and metric units other than those listed above may not be used as distractors in answer choices.
3. All answer choices will be expressed in appropriate units.
4. The units accompanying the answer choices may be abbreviated, but only the abbreviation for inches shall be followed by a period.

Examples of Test Questions

(a) A pencil weighs about 5 grams. A paper clip weighs about _____.



A 1 gram

B 2 kilograms

C 20 grams

D 1 milligram

(b) A classroom door is about _____ meters tall.

A 2

B 1

C 10

D 50

(c) A bicycle might be 2 _____ long.

A meters

B centimeters

C millimeters

D kilometers

Objective 11
Interpret graphs.

Enabling Skills

1. Reading bar and picture graphs
2. Interpreting data

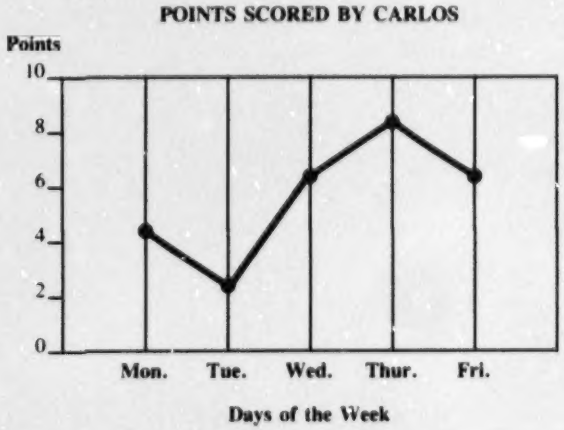
Description of Test Questions

1. Graphs are limited to bar, line, or picture graphs. At least one of each type of graph shall be used.
2. The scale of units used in a graph will involve intervals greater than one.
3. Line and bar graphs shall end at unit points.
4. Graphs shall display no more than eight "sets" of data.
5. Questions shall require either computation, comparison, or other interpretation from a graph.
6. The computation required shall be limited to one operation per item.

Description of Answer Choices

1. Answer choices shall be labeled with appropriate units.
2. Answer choices shall reflect the use of incorrect operations as well as the use of incorrect data.

Examples of Test Questions
Use this graph to answer questions a and b.



(a) How many more points did Carlos score on Thursday than on Monday?

A 4 points

B 8 points

C 12 points

D 2 points

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(b) On which two days did Carlos score the same number of points?

A Wednesday and Friday

B Thursday and Friday

C Monday and Wednesday

D Monday and Tuesday

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Grade 9 Mathematics

General Specifications

I. Test Items

A. All written material, including instructions, item stems, solutions, and answer choices, shall have vocabulary drawn from the Texas Education Agency (TEA) cumulative vocabulary list for the eighth grade.

B. Word problems shall represent various ethnic groups of populations in Texas. The three main groups are black, Hispanic, and white.

C. Word problems shall be free of stereotyping by age, sex, ethnicity, and geographical location.

D. For each tested item, there shall be four responses with only one correct response.

E. Neither "none of the above" nor "all of the above" shall be used as an answer choice.

F. Problem situations shall be appropriate for ninth grade students.

G. All fractions shall be written in vertical form.

H. Money problems shall be written using decimal notation.

II. Test Package Format

A. Graphics, their corresponding items, and response choices shall appear on the same or facing pages.

B. Type size shall be appropriate for ninth grade students.

Objectives and Measurement Specifications

Objective 1
Identify the relationship between decimals, fractions, and percents.

Enabling Skills

1. Changing fractions to decimals, and vice versa
2. Changing a percent to a fraction or decimal
3. Writing equivalent forms of fractions

Description of Test Questions

1. Fractions shall be limited to halves, thirds, fourths, fifths, sixths, eighths, and tenths.
2. Decimals and percents shall be limited to thousandths. Only one- or two-digit decimals or percents can be changed to fractions.
3. All fractions shall be less than one.
4. One item shall pertain to each of the following:
   (a) given a decimal, identify the equivalent fraction
   (b) given a decimal, identify the equivalent percent
   (c) given a fraction, identify the equivalent percent
   (d) given a percent, identify the equivalent fraction

Description of Answer Choices

1. The percent sign (%) shall be used for answer choices identifying percent.
2. Answer choices shall reflect common errors in conversion.
3. Answer choices shall not include fractions which are equivalent to each other.

Examples of Test Questions

(a) Change 0.35 to a fraction.

A $\frac{7}{20}$

B $\frac{3}{5}$

C $\frac{1}{35}$

D $\frac{1}{5}$

40

(b) Change 0.426 to a percent.

A 42.6%

B 426%

C 4.26%

D 57.4%

(c) Change $\frac{1}{4}$ to a percent.

A 25%

B 14%

C 40%

D 2.5%

(d) Change 30% to a fraction.

A $\frac{3}{10}$

B $\frac{1}{3}$

C $\frac{1}{30}$

D $\frac{3}{100}$

Objective 2
Determine simple probabilities.

Enabling Skills

1. Using samples to make predictions
2. Using ratios to express probabilities

Description of Test Questions

1. Items may not include dice, cards, or other gambling devices.
2. Items shall describe only independent events.

Description of Answer Choices

1. Answers will be in fractional form or "out of" form.

Examples of Test Questions

(a) Without looking, pick a jelly bean from a jar containing 4 red and 2 green jelly beans as well as 1 orange and 1 yellow jelly bean. What is the probability that you will draw a red jelly bean?

A 4 out of 8

B 4 out of 12

C 2 out of 12

D 2 out of 8

(b) A manufacturer tested 100 light bulbs and found 5 defective and 95 not defective. Based on these results, what is the probability that the next bulb manufactured will be defective?

A $\frac{5}{100}$

B $\frac{1}{2}$

C $\frac{95}{100}$

D $\frac{5}{95}$

Objective 3
Add and subtract fractions.

Enabling Skills

1. Modeling addition and subtraction of fractions
2. Writing equivalent fractions with a common denominator

Description of Test Questions

1. The value of a fraction or mixed number shall not exceed 10.
2. Denominators and common denominators of fractions shall not exceed 25.
3. Operational signs (+, -) rather than words shall be used to indicate the operations to be performed.
4. Two problems will involve the addition of fractions, and two will involve the subtraction of fractions.
5. The directions will specify that the answer shall be expressed in lowest terms (e.g., $\frac{10}{3}$ or $3\frac{1}{3}$ are both in lowest terms).

Description of Answer Choices

1. All answer choices shall be written in lowest terms.
2. Some answers greater than one shall be expressed as mixed numbers and some shall be expressed as fractions. Forms shall not be mixed in a single problem.

Examples of Test Questions

(a) Solve the problem. Express your answer in lowest terms.

$$\frac{3}{11} + \frac{9}{11} = _____ .$$

A $1\frac{1}{11}$

B $\frac{11}{12}$

C $3\frac{6}{11}$

D $1\frac{2}{11}$

(b) Solve the problem. Express your answer in lowest terms.

$$9\frac{3}{8} - 4\frac{2}{3} = _____ .$$

A $4\frac{17}{24}$

B $4\frac{1}{8}$

C $5\frac{7}{24}$

D $5\frac{1}{5}$

(c) Solve the problem. Express your answer in lowest terms.

$$\frac{13}{4} - \frac{1}{2} = _____ .$$

A $\frac{11}{4}$

B 6

C $\frac{11}{3}$

D $\frac{9}{2}$

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Objective 4
Multiply and divide decimals.

Enabling Skills

1. Computing with whole numbers
2. Applying place value concepts
3. Placing decimals in products or quotients

Description of Test Questions

1. Numbers used in multiplication problems shall not exceed three digits.
2. Divisors shall be limited to two digits and dividends shall be limited to four digits.
3. The multiplication problems shall be displayed in both horizontal and vertical formats.
4. Division problems shall be horizontal in the form $3.6 \div 4$ or $4\overline{)3.6}$.
5. Only one operation shall be required by an item.
6. Two items shall pertain to multiplication, and two shall pertain to division.

Description of Answer Choices

1. One incorrect choice shall be sufficiently close to the correct answer that identification of the correct answer is unlikely by estimation.
2. In one question, an incorrect choice shall show a place value error.
3. All incorrect answers shall reflect common computational errors.

Examples of Test Questions

(a) Solve the problem.

$4.9 \times 8.07 =$ _____ .

A 39.543

B 42.63

C 10.491

D 38.736

(b) Solve the problem.

$5.46 \div 1.3 =$ _____ .

A 4.2

B 3.93

C 0.238 r 52

D 0.42

Objective 5
Solve two- or three-step word problems using the basic operations.

Enabling Skills

1. Using the problem-solving process
   - what question is asked
   - what information is given
   - what operations are to be used
   - what mathematical sentences are needed
2. Using the basic operations

Description of Test Questions

1. Problems shall require the use of at least two or three basic operations with whole numbers.
2. Problems may require the use of money in whole dollar amounts.
3. Whole numbers shall not exceed three digits.
4. Division problems shall not yield remainders.
5. The numbers used in the word problems shall be written in numerical form.

Description of Answer Choices

1. Incorrect answers shall reflect common errors in problem-solving (e.g., using the incorrect operation) as well as common errors in computation.
2. All answer choices will be expressed in appropriate units.

Examples of Test Questions

(a) Ramon delivered 84 papers in 4 hours. Kay delivered 144 papers in 6 hours. How many more papers per hour did Kay deliver than did Ramon?

A 3 papers

B 24 papers

C 60 papers

D 528 papers

(b) It cost Mr. Thomas $450.00 to start a small business at home. In six weeks he collected $842.00 through the business and had $277.00 in expenses. How much profit did Mr. Thomas make through the business over the six weeks?

A $115.00

B $1569.00

C $1015.00

D $669.00

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Objective 6
Solve word problems using ratios, proportions, and percents.

Enabling Skills

1. Using the problem-solving process
   - what question is asked
   - what information is given
   - what operations are to be used
   - what mathematical sentence(s) is(are) needed
2. Using the basic operations
3. Using concepts of ratio, proportion, and percent

Description of Test Questions

1. Problems involving proportions shall require that three of the components be given.

$$\frac{}{X} = \frac{Y}{Z}$$

2. Percentages shall be expressed using whole numbers. No fractional percentages shall be presented.
3. Ratios shall be expressed as: A:B, A to B, or $\frac{A}{B}$.

Description of Answer Choices

1. Incorrect answers shall reflect common errors in problem-solving (e.g., using the incorrect operation) as well as errors in computation.
2. All answer choices will be expressed in appropriate units.

Examples of Test Questions

(a) In the school election, the ratio of total votes cast for Wanda to total votes cast for Jan was 7 to 5. If 280 students voted for Wanda, how many students voted for Jan?

A 200 students

B 280 students

C 336 students

D 672 students

(b) Maria had 25 balloons to inflate for a party. She accidentally popped 6 of the balloons. What percent of the 25 balloons did she accidentally pop?

A 24%

B 41.6%

C 76%

D 32%

47

Objective 7
Solve personal finance problems.

Enabling Skills

1. Using the problem-solving process
   - what question is asked
   - what information is given
   - what operations are to be used
   - what mathematical sentence(s) is(are) needed
2. Using the basic operations
3. Using percents
4. Using checking forms, tax forms, and banking forms

Description of Test Questions

1. One item shall relate to each of the following: (a) banking, (b) personal records, (c) cost comparisons, and (d) taxes.
2. Banking and personal records problems shall be limited to amounts less than $1001.00.
3. Cost comparisons will determine the best buy when the cost of three or four similar objects measured in the same units are compared.
4. Taxation problems shall involve computation of sales tax and/or total cost and income tax.
5. Taxation problems shall involve amounts less than $5001.00.
6. Percents shall be expressed in whole numbers.

Description of Answer Choices

1. Incorrect answers shall represent common errors in problem solving as well as common errors in computation.

Examples of Test Questions

(a) Tina put $200.00 in a savings account at the bank. Her bank pays 8% interest annually on savings. At the end of a year, how much money will be in Tina's account?

A $216.00

B $208.00

C $16.00

D $360.00

(b) Alice had a balance of $83.00 according to her bank book. She withdrew $5.00 on Monday and $8.00 on Wednesday to spend on presents for her brother. What was the balance of her account then?

A $70.00

B $13.00

C $80.00

D $96.00

(c) Marcos is considering buying a car priced at $4725.00. The state sales tax would be 5% of this amount. How much would the car cost including the state sales tax?

A $4961.25

B $4730.00

C $4775.00

D $4488.75

Objective 8
Find the areas of rectangles and triangles.

Enabling Skills

1. Applying area concepts
2. Using formulas to find the areas of geometric regions
3. Using basic computational facts

Description of Test Questions

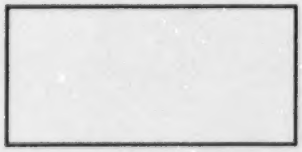
1. Figures may include any type of triangle.
2. Dimensions shall be limited to whole numbers.
3. Questions shall show a figure with a minimum number of appropriate parts labeled. The altitudes of triangles shall be shown with dotted lines.
4. Formulas shall not be given.
5. Two questions will pertain to triangles, and two will pertain to rectangles.

Description of Answer Choices

1. All options shall be expressed in square units.
2. All square units shall be abbreviated, but only the abbreviation for inches will be followed by a period.
3. Abbreviations for square units shall be in the form: unit^2 (e.g., cm^2 , m^2 , in.^{2} , yd^2 , ft^2).

Examples of Test Questions

(a) What is the area enclosed by the rectangle below?



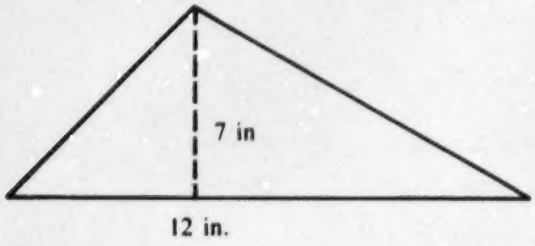
A 36 cm^2

B 26 cm^2

C 13 cm^2

D 169 cm^2

(b) What is the area enclosed by the triangle below?



A 42 in.^{2}

B 84 in.^{2}

C 56 in.^{2}

D 19 in.^{2}

—9—

Objective 9
Solve word problems involving metric/customary measurements using the basic operations.

Enabling Skills

1. Using the problem-solving process
   - what question is asked
   - what information is given
   - what operations are to be used
   - what mathematical sentences are needed
2. Using the basic operations
3. Computing with denominate numbers
4. Using metric and customary units

Description of Test Questions

1. Both customary and metric units that are used shall be selected from units of length, volume/capacity, weight/mass, time, and temperature.
2. If conversion to equivalent measures is required, a statement of equivalence will be given (e.g., 100 centimeters = 1 meter).
3. No conversion between metric and customary units shall be required by an item.
4. Items shall specify the units to be used in the answer.
5. Two problems shall involve the use of metric units, and two shall involve the use of customary units.

Description of Answer Choices

1. Incorrect answers shall reflect common errors in problem-solving (e.g., using the incorrect operation) as well as common errors in computation.
2. All answer choices will be expressed in appropriate units.

Example of Test Questions
A door is 2 meters tall. Mark is 194 centimeters tall. How much space is there above Mark's head when he walks through the door? (100 centimeters = 1 meter)

A 6 centimeters

B 16 centimeters

C 20 centimeters

D 2 centimeters

Objective 10
Use information from charts or graphs to solve word problems.

Enabling Skills

1. Reading and interpreting charts and graphs
2. Using the problem-solving process
   - what question is asked
   - what information is given
   - what operations are to be used
   - what mathematical sentences are needed
3. Using the basic operations

Description of Test Questions

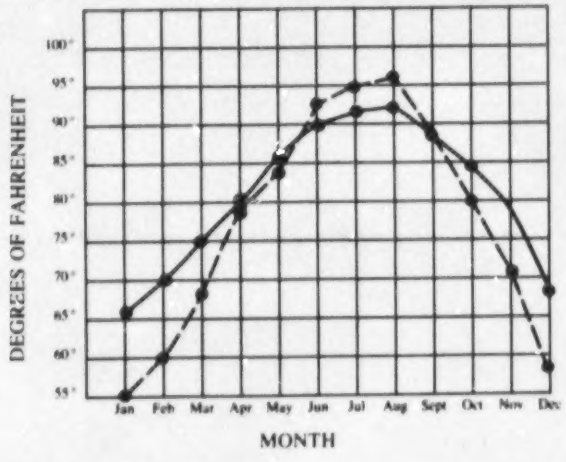
1. Types of graphs shall include only bar, line, circle, or pictographs.
2. Charts shall include both charts and tables.
3. Whole numbers shall not exceed three digits.
4. Each problem shall require one or two operations.
5. Graphs shall not require interpolation of any units other than half units.
6. Information to solve each problem shall be obtained from the graph as well as the problem.

Description of Answer Choices

1. Incorrect answers shall not reflect computational mistakes.
2. All answer choices will be expressed in appropriate units.

Examples of Test Questions

AVERAGE MONTHLY HIGH TEMPERATURES FOR CORPUS CHRISTI AND DALLAS



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(a) On April 4, 1984, the high temperature in Corpus Christi was 72° Fahrenheit. How much below the average high temperature for April was that?

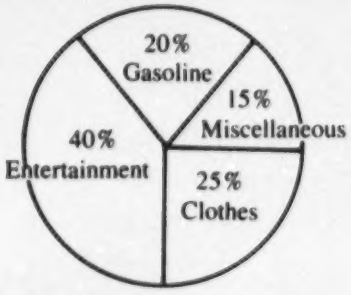
A 8 degrees

B 72 degrees

C 88 degrees

D 6 degrees

Mary's Budget



(b) Mary earns $200.00 per month at her after-school job. The circle graph shows her budget. How much has she allowed for clothes each month?

A $50.00

B $25.00

C $80.00

D $20.00

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Objective 11
Use formulas to solve problems.

Enabling Skills

1. Using basic computation skills
2. Using problem-solving skills
3. Selecting and using appropriate formulas for interest, area of a circle, and volume
4. Solving simple linear equations
5. Using denominate numbers in problem-solving

Description of Test Questions

1. The following formulas may be used on problems:

   Volume of a cube: $V = s^3$

   Volume of a rectangular solid: $V = lwh$

   Area of a circle: $A = \pi r^2$, using 3.14 for π

   Interest: $i = prt$
2. The formulas shall be given as a group on the same or facing pages as the problems.
3. A rectangular solid shall have all three dimensions clearly labeled.
4. A cube may have only one edge labeled and be accompanied by a problem that says, "Find the volume of the cube."
5. Items may contain decimal numbers but not fractions.

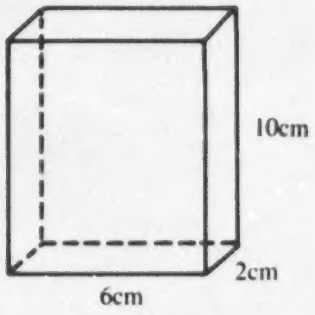
Description of Answer Choices

1. All answer choices will be expressed in appropriate units.
2. At least one incorrect choice may reflect a result obtained from choosing the wrong formula.
3. Answer choices shall be comprised of whole numbers and decimal numbers but not fractions.
4. Abbreviations for square and cubic units shall be in the form: $unit^2$ and $unit^3$ (e.g., m^2, cm^3, in.^{2}, ft^3, yd^3).

Examples of Test Questions
Solve the following problems using the formulas below.

$V = s^3$
$V = lwh$
$A = \pi r^2$, using 3.14 for π
$i = prt$

(a) Find the volume of the box below.



A 120 cm^3

B 18 cm^3

C 36 cm^3

D 62 cm^3

(b) Mrs. Martin borrowed \$400.00 at 12% simple interest per year. If she pays back the loan at the end of three years, what is the total she must pay back?

A \$544.00

B \$412.00

C \$415.00

D \$436.00

COMPLIANCE STATEMENT

TITLE VI, CIVIL RIGHTS ACT OF 1964; THE MODIFIED COURT ORDER, CIVIL ACTION 5281, FEDERAL DISTRICT COURT, EASTERN DISTRICT OF TEXAS, TYLER DIVISION

Reviews of local education agencies pertaining to compliance with Title VI Civil Rights Act of 1964 and with specific requirements of the Modified Court Order, Civil Action No. 5281, Federal District Court, Eastern District of Texas, Tyler Division are conducted periodically by staff representatives of the Texas Education Agency. These reviews cover at least the following policies and practices:

(1) acceptance policies on student transfers from other school districts;

(2) operation of school bus routes or runs on a non-segregated basis;

(3) nondiscrimination in extracurricular activities and the use of school facilities;

(4) nondiscriminatory practices in the hiring, assigning, promoting, paying, demoting, reassigning, or dismissing of faculty and staff members who work with children;

(5) enrollment and assignment of students without discrimination on the basis of race, color, or national origin;

(6) nondiscriminatory practices relating to the use of a student's first language; and

(7) evidence of published procedures for hearing complaints and grievances.

In addition to conducting reviews, the Texas Education Agency staff representatives check complaints of discrimination made by a citizen or citizens residing in a school district where it is alleged discriminatory practices have occurred or are occurring.

Where a violation of Title VI of the Civil Rights Act is found, the findings are reported to the Office for Civil Rights, Department of Health, Education and Welfare.

If there is a direct violation of the Court Order in Civil Action No. 5281 that cannot be cleared through negotiation, the sanctions required by the Court Order are applied.

TITLE VII, CIVIL RIGHTS ACT OF 1964; EXECUTIVE ORDERS 11246 AND 11375; TITLE IX, 1973 EDUCATION AMENDMENTS; REHABILITATION ACT OF 1973 AS AMENDED; 1974 AMENDMENTS TO THE WAGE-HOUR LAW EXPANDING THE AGE DISCRIMINATION IN EMPLOYMENT ACT OF 1967; AND VIETNAM ERA VETERANS READJUSTMENT ASSISTANCE ACT OF 1972 AS AMENDED IN 1974.

It is the policy of the Texas Education Agency to comply fully with the nondiscrimination provisions of all federal and state laws and regulations by assuring that no person shall be excluded from consideration for recruitment, selection, appointment, training, promotion, retention, or any other personnel action, or be denied any benefits or participation in any programs or activities which it operates on the grounds of race, religion, color, national origin, sex, handicap, age, or veteran status (except where age, sex, or handicap constitute a bona fide occupational qualification necessary to proper and efficient administration). The Texas Education Agency makes positive efforts to employ and advance in employment all protected groups.

Texas Education Agency
Austin, Texas
August 1984
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